

REMARKS

In the Office Action of September 22, 2004, claims 1-19 were presented for examination. Of these, claims 16 and 19 were withdrawn; claims 10 and 13 were indicated to contain allowable subject matter; and claims 1-9, 11, 12, 14, 15, 17 and 18 were rejected over the prior art. Herein, claims 1, 5, 14 and 17 are amended, claim 13 is canceled and claim 20 is added. In light of the amendments above and the remarks below, reconsideration is requested.

Claim rejections - 35 USC §102

Claims 1-5, 14, 15, 17 and 18 have been rejected under 35 USC §102(b) as anticipated by Meinel, U.S. patent 4,780,795. Meinel discloses a high voltage isolation amplifier contained in a semiconductor package, using a pair of coplanar fringe capacitors to act as isolation barriers. The fringe capacitors provide for the coupling of small AC signals. One of Meinel's described embodiments does additionally provide a toroidal transformer to enable DC power transfer (in Figs. 4 and 5).

In rejecting claim 1, the Examiner refers to Figure 7 of Meinel, asserting that it shows a package device having a patterned leadframe with at least two isolated patterned dies mounted thereon and transformer component individually mounted to the leadframe between the two patterned dies and adapted to provide selective coupling of energy between the dies. However, the reference to Fig. 7 of Meinel appears to be incorrect, as Fig. 7 does not show a transformer component.

Although Meinel's Figs. 4 and 5 show a toroidal transformer, independent claims 1, 14 and 17 have been amended to require a planar transformer. (Support is found on, for example, page 4, line 29.) Such claims are thus novel over Meinel.

However, the Examiner has, in rejecting claim 5, concluded that Meinel teaches that his transformer 67 is a planar transformer formed in a substrate 46. This is incorrect. The Examiner expressly reasons that transformer 67 should be considered a planar transformer because its top and bottom surfaces are planar" and it has been mounted in a planar configuration." The Examiner's interpretation of the term "planar", however, is not in line with the usage of those

skilled in the art. Consequently, the Examiner's position is unfounded. Planar transformers have a completely different construction from that of toroidal transformers. While we could look many places for suitable definitions, the Examiner need look no further than the definitions in the USPTO's own Manual of Patent Classification. Under class 336 (inductor devices), subclass 232, relating to windings of a "planar type", the definition is "Subject matter wherein the coil turns lie *substantially in a plane.*" (Emphasis added.) Manifestly, the windings of transformer 67 do not lie substantially in a plane. Accordingly, independent claims 1, 14 and 17 are novel over Meinel and the rejection under 35 USC 102(b) should be withdrawn.

Additionally, the independent claims are amended to recite the presence of two planar transformers. Although this limitation is not required for patentability, Applicant notes, however, that Meinel show only one toroidal transformer and two or more planar transformers are not the same thing as one toroidal transformer.

Claims rejections - 35 USC §103

Claims 6 and 7 were rejected under §103(a) as obvious over Meinel in view of Maghribi, U.S. patent application publication 2004/0094835 A1. Claims 8 and 9 were rejected as obvious over Meinel in view of Boyd, U.S. patent 6,362,559. Claims 11 and 12 were rejected as obvious over Meinel in view of Ghamaty et al, U.S. patent application publication 2003/0111660 A1. All of the claims rejected as obvious under §103(a) are dependent claims. As the sole rejection against the independent claims, for lack of novelty under §102(b), has been overcome, the obviousness rejections are now moot.

Nevertheless, to provide a more complete record, the following remarks are offered.

The arrangements set forth in independent claims 1 and 14, and presented as a corresponding method in claim 17, has numerous advantages over the prior art. Planar transformers have the major benefit of being of a smaller size than traditional transformer types, including toroidal transformers. As a result, the circuit of the present invention can be packaged in a smaller package than previously possible. This is of significant advantage in an industry where there is an increasing demand to create integrated circuits of ever reducing size. The use

of a planar transformer also enables higher isolation voltages to be more easily achieved, as compared with conventional wire-wound transformers. Further, the manufacturing costs for planar transformers are also less than for most other transformer types, enabling the package device to be manufactured at a reduced cost.

It would not be obvious to one skilled in the art, based on the disclosure in the principal reference, Meinel, alone or in combination with the other references, to modify the circuit of Meinel to arrive at the circuit of the present invention. Indeed, it was believed that planar transformers were too inefficient power-wise to be used in a packaged circuit such as that of the present invention, when compared to the coupling achieved with transformers having a metal core. However Applicants discovered that this belief was erroneous. They found that planar transformers could be made sufficiently power-efficient for such applications if operated in resonant mode. This mode allows the transformer to operate at high frequencies.

Maghribi relates to a completely different aspect of electronic component manufacture than that of concern to the present invention. Maghribi discloses a process for making circuits on silicone (a completely separate material from "silicon"). Silicone is a low temperature plastic/rubber-like compound, which would be most unsuitable for applications such as that discussed in the present application and to which the present invention is directed, as it would not survive the assembly process typically used in the electronics industry. Therefore, the teachings of Maghribi, either alone or in combination with the other references, would not provide a person of ordinary skill in the art (POSITA) with any insight as to how to solve the problem addressed by the present invention: the making of a low-cost power-efficient IC of small dimensions, incorporating a transformer.

Boyd discloses a piezoelectric transformer with segmented electrodes. It is not concerned with providing a low-cost IC of small size incorporating a transformer. There is no suggestion in Boyd of incorporating this transformer into an IC. Even if a POSITA were to consider replacing the transformer in Meinel with that provided in Boyd, she would not arrive at the circuit of the present invention. In fact, it would be found that such a transformer would not even be suitable for an integrated package, as it would require separate packaging and would be

too large in size. Consequently, the claimed invention is not obvious in light of Boyd, either alone or in combination with any of the other references.

Ghamaty discloses a superlattice thermoelectric device with a plurality of p-type and n-type legs. This device is unrelated to the subject of concern to the present invention. The polyimide "Kapton" is mentioned as a material which could be used as a substrate film for a superlattice thermoelectric device, and a reference to its possible use in a transformer is also included. This reference is based on the information datasheet on the product obtainable from the product manufacturer (DuPont). However, there is no teaching as to how to solve the problem addressed by the present invention and no suggestion for effecting the posited combination.

The independent claims and all the dependent claims are therefore not obvious over any combination of the references of record.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to deposit account No. 23/2825.

Respectfully submitted,

By: 
Steven J. Henry, Reg. No. 27,900
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, Massachusetts 02210-2211
(617) 646-8000

Docket No. T0461.70038 US00
Date: February 14, 2005
x02/22/05x